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STATUS AND TREND OF MOUNTAIN PINE BEETLE INFESTATIONS CLEARWATER NATIONAL FOREST, IDAHO 1959

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STATUS AND TREND OF MOUNTAIN PINE BEETLE INFESTATIONS CLEARWATER NATIONAL FOREST, IDAHO 1959

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Current infestations of the mountain pine beetle (Dendroctonus monticolae, Hopk.) within the Canyon and Bungalow Ranger Districts of the Clearwater National Forest, Idaho were biologically evaluated by personnel of the Missoula Forest Insect Laboratory during August 1959. The evaluation was directed to areas that have contained troublesome infestations in old-growth white pine stands since 1952. The objectives were to determine the present status of the beetle population, to predict the trend of the infestation for 1960, and to provide data on the severity of resource damage caused by the present infestation.

COLLECTION OF DATA

The evaluation was based primarily upon the abundance of beetle-infested white pine trees in the outbreak area under study. Infested pine trees were located on meandering strips through pine stands known to be infested in 1958. As each infested tree was found, its diameter, breast high, was ocularly estimated and the tree was recorded as being equal to the average stand diameter, smaller, or larger than the average. The tree was also recorded as being uninjured prior to attack by the beetle or injured from prolonged infection by white pine blister rust (Cronartium ribicola Fischer), snow breakage, or lightning strikes.

Sections of bark, 6 x 12 inches in size, were removed at breast height from the four cardinal sides of the bole of each infested tree. The abundance, condition, and number of egg galleries were analyzed as the bark was removed. This information was used in predicting the probable number of trees that could be attacked by emerging beetles in 1960. The potential was determined by a biological index developed mathematically from a formula[1/] developed in 1939 for studies of mountain pine beetle behavior in western white pine. The index derived by the formula is based on probable survival of various pine beetle brood stages, sex ratio of the current population, and expected mortality of beetles during their flight after maturity. Predictions based on this formula have been quite reliable in the past, although they have tended to be somewhat conservative.

1/ Bedard, W. D., and Tom T. Terrell. A method of predicting the trend of mountain pine beetle infestations in western white pine. Unpublished report of the Forest Insect Laboratory, Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agriculture, Coeur d'Alene, Idaho. 1939.

RESULTS

The results summarized in table 1 can be expressed in terms of (1) percentage of white pine stand infested, (2) preference for trees previously uninjured or injured, (3) abundance of natural enemies, and (4) biological index of the current infestation.

Table 1.--Comparative characteristics of infestations of mountain pine beetle in white pine timber in the Bungalow and Canyon Ranger Districts, Clearwater National Forest, Idaho in 1958 and 1959

	1958	1959
Trees examined	5,402	5,687
Trees infested	104	101
Average percentage of trees infested (weighted)	2.43	2.45
Number of trees injured prior to attack	59	43
Natural enemies:		
Hymenopterous (wasp-like), per sq. ft. of bark	0.8	0.5
Coleopterous (beetles), per sq. ft. of bark	1.1	0.1
Dipterous (flies), per sq. ft. of bark	2.4	2.6
Biological index	1.2	0.9

The percentage of white pine stands killed by beetles in the Bungalow and Canyon Ranger Districts has varied little since 1958--2.45 in 1959 and 2.43 in 1958. The biological index formulated in 1958 indicated that 20 percent more trees would be attacked by the beetle in these areas in 1959 than in 1958. This expected increase, however, was not fully realized. Differences between predicted and actual percentages of trees killed have frequently resulted from use of the formula. Usually these differences have been small with actual percentages rather consistently less than those predicted.

Trees killed by the beetle in 1959 were about evenly divided, as in 1958, between trees injured or weakened previous to beetle attack and those that were not. In the former category were trees with varying degrees of damage from white pine blister rust (Cronartium ribicola Fischer), snow breakage, or lightning strikes. On the basis of the selection shown in these two years, there appears to be no preference by the beetle for trees in either category.

Natural enemies of the mountain pine beetle were probably not present in sufficient numbers to cause more than token mortality of the latter. Natural enemies observed belonged to the orders Hymenoptera (wasp-like insects), Coleoptera (beetles) and Diptera (flies). These insects which feed upon and cause the death of bark beetles together averaged only 3.2 per square foot of infested bark surface in 1959; a slight reduction over the 4.3 per square foot counted in 1958.

The biological index derived from measurements obtained in the evaluation was 0.9 compared to 1.2 in 1958 (table 1). An index of 1.0 indicates a static infestation, or that one tree will be attacked and killed by the mountain pine beetle in 1960 for every tree thus killed in 1959. An index of 0.9 in 1959, therefore, indicates that the mortality of white pine trees in the presently infested areas may be only 90 percent of that caused by the beetle in the same areas in 1959.

DISCUSSION

The mountain pine beetle infestations described in this report are of a low-order epidemic nature. Past appraisals and evaluations in these and other old-growth white pine forests in northern Idaho indicate that beetle infestations of this magnitude might be considered to be chronic. Their relative stability from year to year suggests that they have been, and might continue to be, a serious drain of fine quality timber in virgin, old-growth white pine forests as long as these forests remain undeveloped and natural control of the beetle is not accelerated.

Past attempts to curb beetle-caused tree mortality in these forests by direct control methods have resulted in varying degrees of success, but success, when achieved, has usually been of short duration. Present-day economics do not favor further applications of these beetle control measures. Fortunately, the utilization of these old-growth pine forests has crept steadily forward, and wherever it has gone, the pine beetle infestations have diminished or disappeared according to the degree of utilization.

The most permanent relief from damage by the mountain pine beetle in old-growth white pine stands would result from (1) converting the stand to younger age classes less susceptible to attack or (2) salvaging infested trees as they occur by mobile logging equipment operating from a comprehensive road system.